DOCUMENT RESUME

ED 481 390 SP 041 736

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TITLE	Direct Instruction Model for Secondary Schools: The Research Base for the REACH System.
INSTITUTION	Center for Applied Research in Education, Inc., New York, NY.
PUB DATE	2002-03-00
NOTE	13p.
PUB TYPE	Information Analyses (070) -- Reports - Descriptive (141)
EDRS PRICE	EDRS Price MF01/PC01 Plus Postage.
DESCRIPTORS	Curriculum Development; Faculty Development; High Risk Students; *Language Arts; *Literacy Education; *Reading Achievement; Reading Comprehension; *Reading Instruction; *Reading Skills; Secondary Education; Spelling; State Standards; Teaching Methods; Thinking Skills; Writing Skills
IDENTIFIERS	California; *Direct Instruction

ABSTRACT

The Reach System is a set of direct instruction (DI) programs designed to bring students who are performing as low as grade 1 level in language arts to performing at grade 8 level within 2 years of instruction delivered 3 hours per day. It involves a comprehensive system of professional development, curriculum, and instruction within the larger DI Model for Secondary Schools. The initiative includes innovative strategies and proven methods of student learning, teaching, and school management, providing explicit, systematic instruction built around three programs: Corrective Reading, Spelling Through Morphographs, and Reasoning and Writing. California has approved the Reach System as a stand-alone language arts program for students performing 2 years or more below grade level in grades 4-8. It aligns specifically with California's language arts standards and in general with most states' language arts standards. Data on schools that have implemented the Reach System show that when schools implement the comprehension programs of Corrective Reading and/or Reasoning and Writing with all of their students, there are strong SAT-9 gains on the California statewide assessments. Research also indicates that students who are academically behind their peers will never achieve at the level of their peers at the end of 8th grade without more intensive instruction in comprehension, writing, reasoning, and spelling. (Contains 42 references, 4 figures, and 2 tables.) (SM)

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Direct Instruction Model for Secondary Schools: The Research Base for the REACH System

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Center for Applied Research in Education

March, 2002

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The *Reach System* is a set of Direct Instruction programs that will bring students who are performing as low as grade 1 level in language arts to performing at grade 8 level within two years of instruction delivered 3 hours a day. The state of California has approved the *Reach System* as a stand-alone language arts program for students performing two years or more below grade level in grades 4 through 8. The *Reach System* aligns specifically with the language arts standards of California and in general with the language arts standards of most states. The *Reach System* is based on reliable research and effective practices and has been successfully replicated in schools with diverse characteristics. The *Reach System* includes innovative strategies and proven methods of student learning, teaching, and school management.

Theoretical or Research Foundation for the Program.

The *Reach System* is a specific comprehensive system of professional development, curriculum, and instruction within the larger Direct Instruction (DI) Model for Secondary Schools. Consistent with the DI model, the goal of the *Reach System* is to close the educational gaps faced by at-risk students. To accomplish this goal, the *Reach* is designed to accelerate learning: (a) by providing curriculum that is highly engineered for learning success and efficiency (Grossen, Carnine, & Silbert, 2000), and (b) by achieving 100% on-task behavior using every available minute of the school period.

Struggling readers who have failed for several years need more instructional time focused on reading and comprehension than is typically allotted in intermediate, middle and high school schedules. According the Reid Lyon et al. (2001), "Remediation models for older children have been ineffective for several reasons, but two stand out. First, the standard instruction provided through remediation is frequently too little, too general, and too unsystematic. Second, even if the instruction were of high quality, it may be too late given that many children are already far behind and less motivated to learn to read following a year or more of reading failure."

The *Reach System* addresses typical program limitations by providing explicit, systematic instruction built around three previously published programs: *Corrective Reading, Spelling Through Morphographs,* and *Reasoning and Writing*. These three instructional program series are combined to provide sufficient literacy instruction (at least two to three periods per day), to reverse the failure trajectory of struggling readers. These series of programs are both research-

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based and research-validated; that is, each program incorporates principles of instructional design that have been shown to meet the needs of students with diverse characteristics (Kameenui & Carnine, 2001), and has been further validated with controlled experimental studies evaluating the programs' effects on student achievement. Highlights from studies will be described.

The *Corrective Reading Program*, originally published in 1973 (Englemann, et al.), was designed to remediate basic literacy skills for older struggling readers. The *Corrective Reading* program is a Direct Instruction program that has over 30 years of data indicating that it can be used to accelerate the reading acquisition of older students with reading problems. These studies generally show that when implemented consistently (at least 4 days a week) by well-trained teachers, the growth rate in reading increases to two or three times the normal rate, making it possible for many students to catch up in one year of instruction (see Grossen, 1998, for a review of the research).

This pattern of effectiveness has been replicated with remedial readers in England, Australia, and North America (Campbell, 1988; Clunie-Ross, 1990; Gregory, Hackney, & Gregory, 1982; Maggs & Murdoch, 1979; Vitale, Medland, Romance, & Weaver, 1993), with students with limited English (Gersten, Brockway, & Henares, 1983; Grossen, 2002; Grossen, in press), non-categorical implementations with special ed and regular ed struggling readers (Grossen, Carnine, & Silbert, 2000; Grossen 2000; Grossen, in press; Holdsworth, 1984-5; Kasendorf & McQuaid, 1987; Lee County School District, 1977; Ross, 1998; Sommers, 1991, 1995), and in special education classes (Arthur, 1988; Edlund & Ogle, 1988; Glang, Singer, Cooley, & Tish, 1991; Polloway, Epstein, Polloway, Patton, & Ball, 1986; Thomson, 1992; Thorne, 1978).

Corrective Reading was designed specifically for older nonreading or struggling readers. The *Corrective Reading* sound-symbol system, mastery of which is the key to fluent reading, includes only 57 sound-symbol relationships, substantially fewer sound-symbols than the Orton-Gillingham system. The sounds students learn for the symbols were analyzed for maximum generalizability, so that students are be able to read more by learning fewer rules. For example, the sound taught for the letter y is "yee," which works both at the beginning and end of words: yellow (yee-ellow), puppy (pupp-yee). And it works in the middle of words: gym (g-yee-m). For many words the sound-symbol system produces close approximations of the real word. Students learn to use context to "make it a real word" for correct word identification.

Spelling Through Morphographs complements the decoding instruction in *Corrective Reading* with a carefully engineered program for encoding instruction. *Spelling Through Morphographs* teaches a morphemic analysis for understanding meaning and spelling words.

Students learn 600 basic morphemes and three major rules for combining them (when to drop the e, when to double and consonant, and when to change y to i). With these tools students can spell 12,000 words and have a general strategy for getting meaning from the words by analyzing the Latin-based components.

Fluent word identification is not the only consideration. The comprehension strand in *Corrective Reading* was designed to teach students critical thinking skills and content knowledge. In addition, the *Reasoning and Writing* programs were designed to teach grade level reasoning and writing skills and parts of speech and useage content in a manner that enables at-risk students who normally do not experience success in more cognitively complex content to also succeed.

Reasoning and Writing teaches students writing skills beginning with narrative writing, then moving into expository, particularly persuasive and critique writing. Students learning critical reasoning skills, such as identifying inconsistencies and contradictions, and learn to write critiques of false-cause arguments, arguments with misleading claims, arguments lacking specificity, and so on. Students also learn to write sophisticated compare-and-contrast essays.

The teaching strategies used in *Reasoning and Writing* were experimentally tested before the program was published. These innovative strategies demonstrated powerful effects in bridging the gap between the performance of low-achieving students and high- or normally-achieving students in cognitively complex content:

1. On a variety of measures of argument construction and critiquing, high school students with learning disabilities scored as high as high school students in an honors English class and higher than college students enrolled in a teacher certification program (Grossen & Carnine, 1990).

2. In constructing arguments, high school students with disabilities scored significantly higher than college students enrolled in a teacher certification program and scored at the same level as a group college students enrolled in a logic class. (Collins & Carnine, 1988).

The above studies represent level 2 research (Grossen, 1996). Well-trained teachers in smaller scale, tightly controlled settings delivered the instruction with high fidelity. More recently level 3 studies have demonstrated how this level of fidelity in implementation could be maintained when bringing the instruction to scale in school-wide implementations in high-need schools (Grossen, Carnine, & Silbert, 2000; Grossen, 2002; Grossen, in press). The Goethe Middle School Research Project was the first step toward level 3 research with the Direct Instruction Model for Secondary Schools. The *Reach System* (Grossen, 2002) represents the knowledge base developed from the Goethe Research Project (Grossen, Carnine, & Silbert,

2000) and the knowledge base from the subsequent replications—failures and successes—that are also being published (Grossen, 2002; Grossen, in press).

Evaluation-Based Evidence of Effectiveness

Quantitative evaluation of the learning of low-achieving middle-school students has been problematic. Norm-referenced summaries of performance, such as the SAT-9, are not sensitive to the growth of students at the low end of the distribution. Table 1 presents an example using real data from the Multilevel Academic Survey Test (MAST) (Howell, Zucker, & Morehead, 1985), which has norms for groups in Grades 2-8. Note that the scores of a student vary dramatically depending on what grade level the student is in. If the student is a third grader then a 6 point gain from 12 to 18 on the test results in a whopping 48 percentile gain, (28 NCE point gain). If the same student takes this test as an 8th grader, the gain is only 4 percentile point (14 NCE point gain). This means that the older the student, the harder it is to show improvement on norm-referenced standardized tests of reading achievement. This phenomenon occurs on any norm-referenced test. The use of an NCE scale does not resolve the problem.

Table 1. Comparison of Percentile and NCE scores for a grade 3 and a grade 8 student achieving the same raw scores.

	Raw Score	Grade 3 Student Percentile (NCE)	Grade 8 Student Percentile (NCE)
Pretest	12	16 (29)	1 (1)
Posttest	18	64 (57)	5 (15)
Difference		48 (28)	4 (14)

Different from the MAST, the Sat-9 is normed for only one grade level, so easier items are eliminated from the test. Consequently, students must score at least at the 6th percentile to score significantly better than chance. The 6th percentile on the grade 8 level test represents approximately a 5th grade level, according to the MAST. This means that students reading below a 5th grade level are generally achieving scores on the SAT-9 that are no better than guessing. This is not a criticism of any norm-referenced test. This is only to point out the importance of using an alternative to norm-referenced tests for evaluating the achievement gains of older students who are significantly behind grade level.

Large-scale studies with a control group. We generally have used the MAST to evaluate the learning gains of students who are severely behind, comparing their performance to that of other age groups for which the MAST has been normed. Table 2 shows the results of the first

wave of large-scale replications of *Corrective Reading* that occasionally included various additional components of the *Reach System* (Grossen, 2002). These implementations included teacher training that has become the professional development model that CARE uses in providing service to schools implementing the *Reach System.* These 11 schools in California received in-class training, follow-up coaching, network support, and progress monitoring. The control school also received extensive support in implementing a new program that did not include any program components of the *Reach System.*

The schools included a variety of demographic profiles. S1 was most similar to the control school, having a higher percentage of students who performed in the lowest quartile. The largest ethnic group represented by these low performers was Latino. The other schools included large subgroups of African-American and Asian students, as well as Latino groups. It is important to note that as you look at Table 2 remember that the goal is to reduce the number of students performing below the 2nd grade level (initial, left side pre-post columns) and increase

Table 2. Change in literacy levels of students placed in *Corrective Reading*—Decoding for 11 schools in California, according to the Multi-level Academic Survey Test. Schools are ordered from highest percentages of low-performing students to lowest. (Taken from Grossen, 2002)

	N	Percent scoring below 2nd grade level		Change	Percent scoring above 5th grade level		Change
		Pre	Post		Pre	Post	
Control School	59	56	53	-3	5	14	+9
S1[1]	245	55	31	-24	9	24	+15
S2[2]	59	44	25	-19	10	37	+27
S3[1]	129	44	18	-26	13	33	+20
S4[2]	150	41	15	-26	16	38	+22
S5[1]	282	34	14	-20	20	53	+33
S6[2]	338	34	14	-20	22	55	+33
S7[2]	183	27	13	-14	6	21	+15
S8[2]	82	24	13	-11	20	43	+23
S9[2,3]	110	23	6	-17	20	49	+29
S10[2,3]	558	17	9	-8	42	56	+14
S11[2]	455	14	5	-9	44	61	+17

[1]The period between pre- and posttest for these schools is 4 months.
[2]The period between pre-and posttest for these schools is 8 months.
[3]These schools are in their second year of implementation.

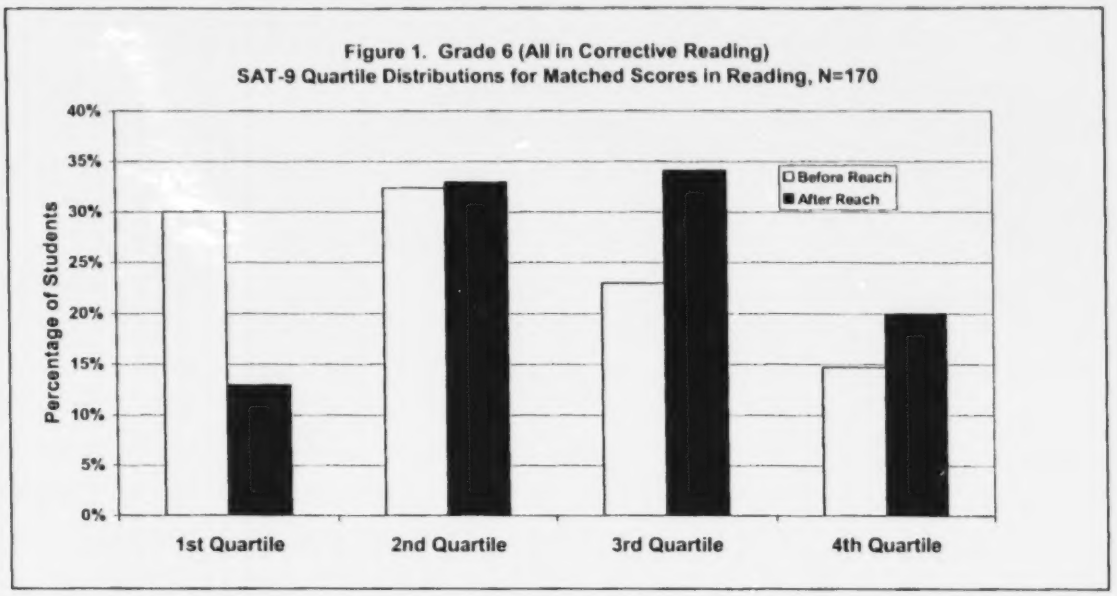


Figure 1. Grade 6 (All in Corrective Reading)
SAT-9 Quartile Distributions for Matched Scores in Reading, N=170
Percentage of Students
40%
35%
30%
25%
20%
15%
10%
5%
0%
Before Reach
After Reach
1st Quartile
2nd Quartile
3rd Quartile
4th Quartile

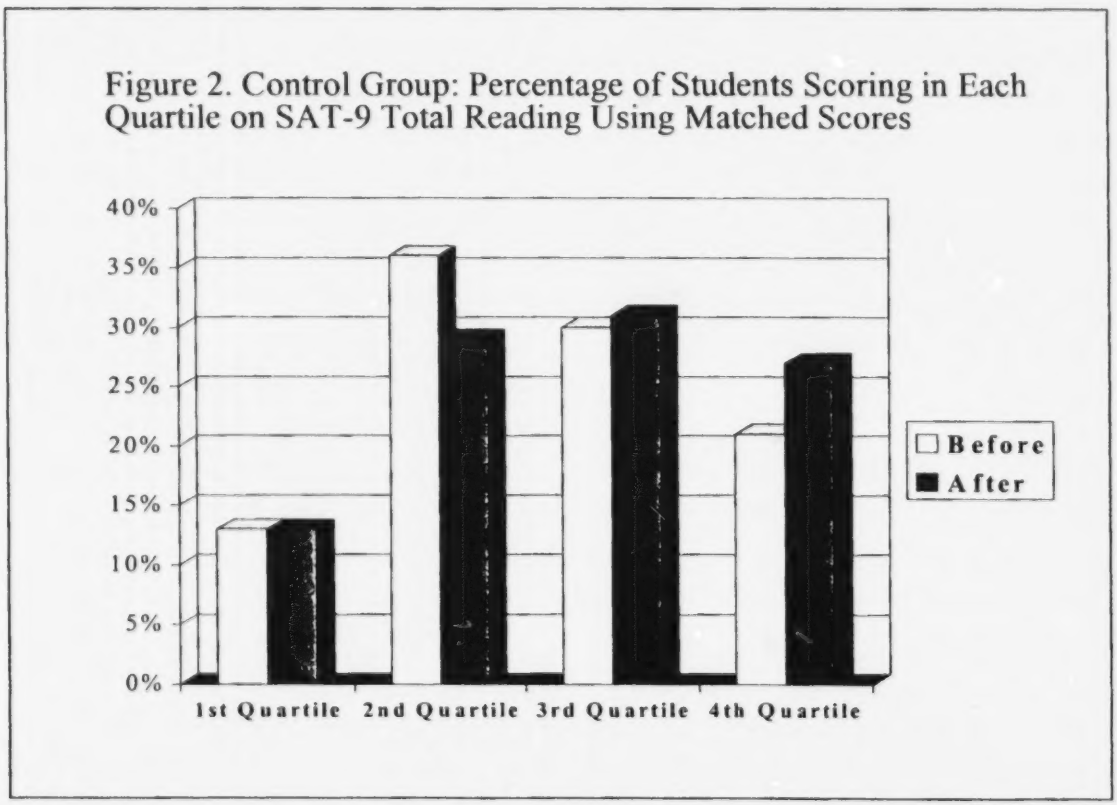
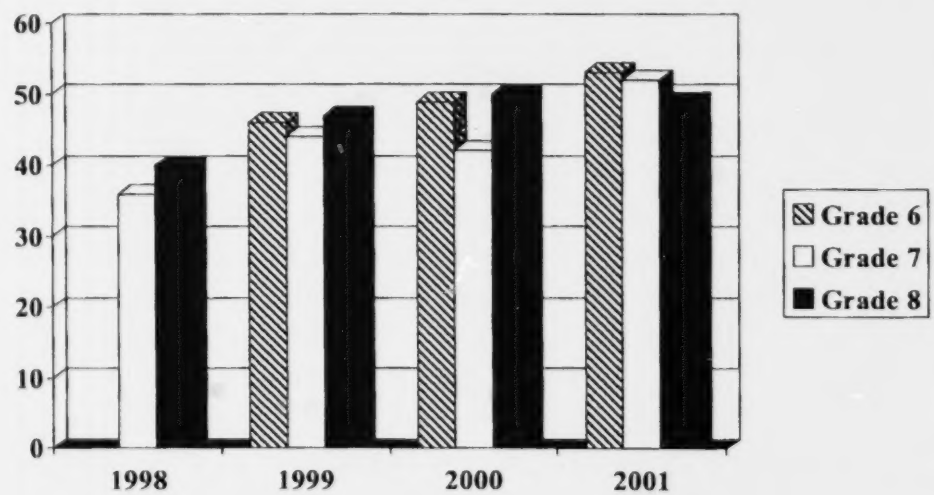


Figure 2. Control Group: Percentage of Students Scoring in Each Quartile on SAT-9 Total Reading Using Matched Scores
40%
35%
30%
25%
20%
15%
10%
5%
0%
Before
After
1st Quartile
2nd Quartile
3rd Quartile
4th Quartile

Schoolwide implementations of Reach System components. When schools implement the comprehension programs of *Corrective Reading* and / or *Reasoning and Writing* with all of their students, we find strong SAT-9 gains on the California statewide assessments. We examined the results of a schoolwide implementation using matched SAT-9 scores. (The state generally reports unmatched scores on the state webpage.) Figure 1 shows the percentage of students performing in each quartile on the total reading score on the test prior to implementation and on the test after implementation. Figure 2 shows the same information for the control group, which were the grade 7 and grade 8 students in the same school, who did not receive *Corrective Reading*. Figures 1 and 2 show a common pattern of results for *Reach System* programs. Without a Direct Instruction program, students in the bottom quartile tend to remain in the bottom quartile, as is clearly illustrated in Figure 2. Less powerful models of instruction that are common in schools, are more effective in raising students near the middle of the distribution. But with the more powerful implementation of the *Reach System* components, such as *Corrective Reading*, students move out of the bottom quartile as shown in Figure 1.

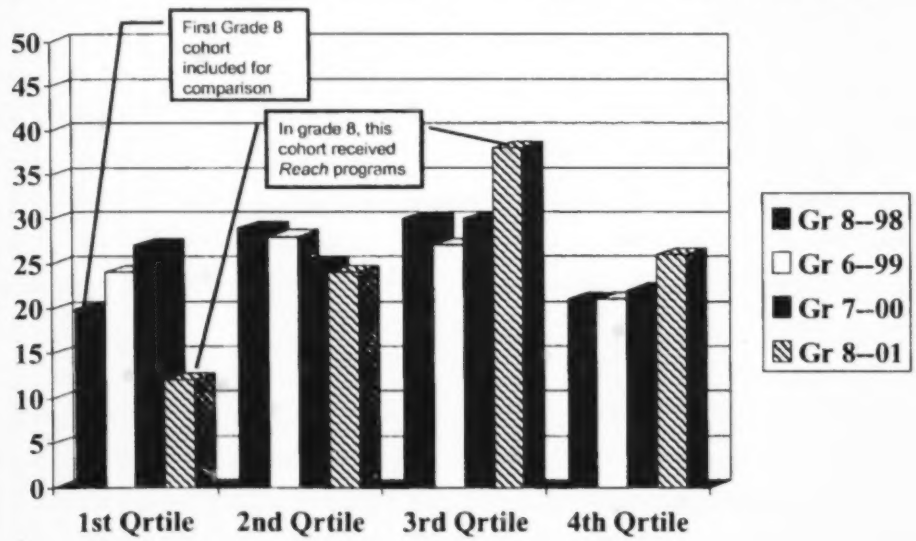
Figure 3. Effects of 3 Years of REACH
Percentile of Mean Raw Score on SAT-9 Total Reading
(Source: CDE website results for LeRoyGreene MS, Natomas SD)



Sustained gains for three years or more. LeRoy Greene Middle School in Natomas School District (Sacramento) was one of the first schools to implement the model developed in the Goethe Research Project. LeRoy Greene implemented *Corrective Reading* and/or *Reasoning and Writing* in all grade levels for all students. Figure 3 shows the results over the four years of the SAT-9 testing program. The DI programs resulted in consistent gains overtime in the achievement of the school as a whole, as indicated by the California state testing program.

Effects of all REACH components. South Lake Tahoe Middle School implemented *Corrective Reading,* followed by a schoolwide implementation of *Expressive Writing II, Reasoning and Writing,* Comprehension programs from *Corrective Reading,* and a grade 6 implementation of *Spelling Through Morphographs.* All grades gained approximately 10 percentile points in Sat-9 reading, and language arts (mean score gains ranged from 7 to 14). Students receiving *Spelling Through Morphographs* also gained an average of 13 percentile points (grade 6 students). Figure 4 displays the change in the performance over time of graduating grade 8 cohort, with the performance of the first grade 8 cohort as a comparison.

Figure 4. Effects on a Cohort: South Tahoe SAT-9 Total Reading Scores. (The full *Reach* program implemented prior to 4th year). Percentage of Students in each Quartile (Source: CDE website)



Implementation

As Lyon et al. (2001) have found in the research centers funded by National Instutitue for Child Health and Development, typical remediation models for older students have not provided intensive or systematic instruction necessary to accelerate these struggling readers to a point they can catch up to their grade-level peers. The Direct Instruction programs used in the *Reach System* address these weaknesses by providing systematic, explicit instruction in literacy skills. The *Reach System* also involves more instructional time per day for accelerating these struggling readers.

Schools interested in implementing the *Reach System* may start with programs addressing the basic decoding and comprehension needs of their struggling readers. Common practices are to schedule an extra reading period for all students and assign all teaching staff members to teach reading to a class of students for that period. However the students who are more academically behind their peers will need more intensive instructional support. The research using the *Reach System* has shown that these students will never achieve at the level of their peers at the end of eighth grade unless more intensive instruction in comprehension, writing, reasoning, and spelling is provided.

The following flow chart provides a planning guide for determining the appropriate level of intervention needed. The first step is to analyze the individual performance of all students and determine the magnitude of the problem. See Figures 5 and 6 on the next page for details in planning interventions.

The *Reach* programs have been fully implemented in multiple sites for more than three years. Districts with extensive implementations include many districts in East Riverside County, especially Palm Springs School District, Port Hueneme SD, Sacramento SD, Natomas SD, San Juan SD, Marysville SD, Stockton SD, Lincoln SD, Grant SD, Lake Tahoe SD, and others.

CARE's implementors are persons who have been working with these implementations to achieve the results documented above. The knowledge gained in working with these implementations has been developed into an implementation manual that will guide the implementations that CARE manages.

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